

governing Non-discrimination, Non-segregated Facilities; Payment of Predetermined Minimum Wage, Statements and Payrolls; Record of Materials, Supplies, and Labor; Subletting or Assigning the Contract; Safety and Accident Prevention; False Statements Concerning Highway Projects; Implementation of Clean Air Act and Federal Water Pollution Control Act; Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion; and Certification Regarding Use of Contract Funds for Lobbying. For a related provision, see Section 104.3.8 - Wage Rates and Labor Laws.

SECTION 106 - QUALITY

Scope of Section This section contains general provisions related to the Quality of Work including roles, standards, Materials, Quality Control, Acceptance, Non-conforming Work, and warranties. When specified in the contract, the Department will use the quality level analysis in this Section to determine quality-based financial incentives and disincentives.

106.1 Roles Regarding Quality

106.1.1 Cooperation The Contractor and the Department shall work cooperatively within their respective Quality Assurance (QA) responsibilities to produce and document a high quality project, meeting or exceeding the quality requirements of the contract.

106.1.2 Role of the Contractor The Contractor is responsible for all aspects of the quality of construction, including labor, equipment, materials, incidentals, processes, construction methods, and QC. When required by the contract, the Contractor shall develop, submit for approval, implement, and adjust if necessary a QCP for the work specified.

106.1.3 Role of the Department The Department is responsible for providing a quality design, approving the QCP, and assuring that the Contractor is following the QCP. The Department will perform acceptance sampling, testing, and inspection for any element of the work to ensure compliance with the QCP and contract requirements. The Department may also perform IA sampling and testing at any time.

106.2 Quality Standards

106.2.1 Conformity with Contract The Contractor shall comply with all contract requirements in performance of the work. Any required plans such as QCP, the TCP, and the SEWPCP, as approved by the Department, are binding upon the Contractor as contract requirements.

106.2.2 Conformity with Other Standards Unless otherwise provided in the contract, all work shall conform to the following standards, as applicable.

- A. MDOT
- B. AASHTO
- C. ASTM
- D. AREMA
- E. Standard conditions and special conditions contained in any permit
- F. Manual on Uniform Traffic Control Devices (MUTCD)
- G. American with Disabilities Act (ADA)

106.2.3 Industry Standards If there is no applicable standard set forth in this Contract for a particular item of work, then the Contractor shall perform that item of work in accordance with industry standards prevailing at the time of bid.

106.3 Material Quality

106.3.1 General Materials and manufactured products incorporated into the work shall be new unless otherwise specified, free from defect, and in conformity with the contract.

When material is fabricated or treated with another material or where any combination of materials is assembled to form a finished product, any or all of which are covered by specifications, the Department may reject the finished product if any of the components do not comply with the specifications.

Title to all hot mix asphalt to be furnished by the Contractor shall pass to the State of Maine, Department of Transportation, immediately before installation. The preceding sentence shall not in any way affect any right or remedy the Department has relating to the quality of the material, installation, or workmanship.

106.3.2 Quality Requirements Materials shall meet the requirements of the contract at the time they are incorporated into the work. The Contractor shall test proposed sources

of materials, and materials shall not be used in the work until passing results are obtained.

The Contractor shall perform QC inspection, sampling, testing, and documentation in accordance with the contract requirements. For work without specific QC requirements, the Contractor shall perform inspection, sampling, and testing, as the Contractor deems necessary to ensure adequate process control and end product quality.

The Contractor shall provide all facilities, testing equipment, and material samples as the Department may require to collect and forward Acceptance and IA samples, and conduct related field tests.

The Contractor shall supply materials and perform work using methods and equipment in a manner, which will not degrade the quality of the materials. Materials with prior approval that become unfit for use or fall outside the specification limits will result in the affected product being declared non-conforming work. For a related provision, see Section 106.8 - Non-conforming Work.

The cost of the Contractor's QC activities and for furnishing facilities, testing equipment, and samples for the Department's Acceptance and IA activities is incidental to the related Pay Items.

106.3.3 Sources

A. General The Contractor shall furnish all materials and products required to complete the work, except as otherwise provided in the Contract. Unless otherwise specified in the Contract, the Contractor shall use only those products contained on the Department's List of Pre-Approved Materials (available on the MDOT internet site - www.State.me.us/mdot), if a list is established for that type of product or material.

B. Department Furnished Materials The Contract may specify that the Department will furnish certain materials. If the Contractor reasonably believes that the Department-furnished material is deficient in any way, the Contractor shall immediately notify the Department before accepting delivery. After acceptance of delivery, the Contractor is responsible for all risk or loss of Department-furnished material. The cost of inspecting, handling, and storing Department-furnished materials after delivery is incidental to the Contract. The Department may deduct from amounts otherwise due the Contractor all costs necessary to make good any shortage, damage,

or deficiencies discovered after the Contractor accepts delivery including any demurrage or car hire charges.

106.3.4 Storage The Contractor shall store materials to preserve their quality and fitness for the work. If materials fail to meet the requirements of the Contract, the materials will be rejected. The Department may inspect stored materials at any time. The Contractor shall locate stored materials to facilitate their prompt inspection. The Department may approve portions of land within the Right-of-Way for storage purposes and for the placing of the Contractor's equipment, but the Contractor shall provide any additional land required without cost to the Department. The Contractor shall not use private property for storage purposes without written permission of the owner, with copies of the written permission furnished to the Department upon request. The Contractor shall restore all storage sites, whether within the Right-of-Way or on private property, to original condition at the completion of the project, without cost to the Department. The provisions of this Section shall not apply to the stripping and storing of topsoil or to other materials salvaged from the work.

106.3.5 Handling The Contractor shall handle all materials in a manner that preserves their quality and fitness for the work. The Contractor shall transport aggregates in tight vehicles to avoid loss or segregation of materials after loading and measuring.

106.3.6 Unacceptable Materials The Department may reject materials not conforming to the Specifications at any time, and the Contractor shall remove them immediately from the project site unless otherwise instructed by the Department. The Contractor shall not store or use rejected materials on any Department project.

106.3.7 Sampling and Testing Qualified Departmental personnel may take samples for Acceptance Testing. Work in which material is used without the Department's approval will be at the Contractor's sole risk and the work will be considered non-conforming work. Unless otherwise designated, the Department's testing costs will be at the expense of the Department. Materials being used are subject to inspection, testing, or rejection at any time. The Department will furnish copies of test reports to the Contractor upon request.

The Contractor is responsible for the quality of construction and materials incorporated into the work. The Contractor shall perform all necessary QC inspection, sampling, and testing in accordance with the approved QCP. If a QCP is not required,

the Contractor is still responsible for all QC necessary for a high quality project. The Contractor shall not rely on the results of the Department's Acceptance Testing being available for process QC.

The Contractor may observe the Department's sampling and testing activities. If the Contractor observes a deviation from the specified sampling or testing procedures, then the Contractor shall describe the deviation to the Department immediately and document the deviation in writing within 24 hours.

The Department will randomly sample and test items designated for Acceptance under Method A in accordance with the procedure specified for that item. The Department may also sample and test at any time if the material appears defective or when the Department determines that a change in the process or product has occurred. Acceptance Tests will govern in all cases for determination of pay factors without regard to QC tests, unless otherwise specified in the Contract.

When directed by the Department, the Contractor shall sample and test any material, which appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or corrected by the Contractor. All sampling shall be in accordance with Department, AASHTO, or ASTM procedures as specified for the material being sampled.

106.4 Quality Control

106.4.1 General When required by Special Provision, the Contractor shall develop, submit, and implement a Quality Control Plan (QCP), approved by the Department, for those items of work specified that will result in work that meets or exceeds the quality requirements of this Contract. Regardless of whether a QCP is required, Quality Control for all work is the Contractor's responsibility.

A. Submittal Within 21 Days of Contract Execution or at least 30 days before any related work is to be performed, the Contractor shall submit three copies of its QCP to the Department.

B. Approval Within 14 Days of Receipt, the Department will determine if the QCP is in accordance with the requirements of this Section 106.4 and (1) notify the Contractor that its QCP is approved or (2) return it for any needed revisions. If

returned for revision, the Contractor shall resubmit three copies of its revised QCP as provided above within 7 days and the Department will have 7 days from receipt of the revised plan to notify the Contractor whether its QCP is approved or again requires revision. Additional iterations will occur in a like manner until the Department approves the Contractor's QCP. Failure to submit an approvable QCP shall not be cause for any adjustment to compensation or time.

Upon final approval of the QCP, the Contractor shall provide 5 bound copies to the Department. All Contractor QC personnel shall also be issued their own copy of the approved QCP.

The Contractor's QCP shall consist of plans, procedures, responsibilities, authority, and an organizational structure that demonstrates that an effective level of QC will exist and that the end result products will comply with all Contract requirements. The Contractor shall provide all necessary QC inspection, sampling, and testing to implement the QCP. The QCP shall include an organizational structure and reporting requirements that demonstrate that QC personnel have sufficient independence to allow them to be primarily concerned with quality, as opposed to schedule and budget.

The individual administering the QCP shall be a full-time employee of or a consultant engaged by the Contractor. The individual shall have full authority to institute any and all actions necessary for the successful implementation of the QCP.

The Department will not sample or test for process control or assist in controlling the Contractor's production operations. The Contractor shall provide QC personnel and testing equipment capable of providing a quality product that meets or exceeds the Contract requirements. Continued production of non-conforming work for a reduced price as determined by the Department, instead of making adjustments to bring work into conformance, is not allowed.

106.4.2 Quality Control Plan Requirements The QCP shall include, at a minimum, the following:

- Construction items covered by the QCP, as specified in the Contract
- Sampling location and techniques
- Tests and test methods
- Testing frequencies

Inspection frequencies

Documentation procedures, including:

- Inspection and test records
- Temperature measurements
- Accuracy, calibration, or recalibration checks performed on production or testing equipment

The QCP shall identify the Contractor's QC personnel, including the company official ultimately responsible for the quality of the work. The Department's QCP approval process may include inspection of testing equipment and a sampling and testing demonstration by the Contractor's QC inspector(s) to assure an acceptable level of performance.

106.4.3 Testing Qualified technicians in laboratories approved by the Department shall perform all QC testing covered by the QCP. Technician qualifications shall be as described in the Contract for the corresponding item of work.

Laboratory facilities shall be clean and all equipment shall be maintained in proper working condition. The Department shall be permitted unrestricted access to inspect the Contractor's laboratory facility. The Department will advise the Contractor in writing of any noted deficiencies concerning the laboratory facility, equipment, supplies, or testing personnel and procedures. Deficiencies shall be grounds for the Department to order an immediate stop to incorporating materials into the work until deficiencies are corrected. Work already in place affected by QC deficiencies is non-conforming work.

The Contractor shall maintain records of all inspections and tests. The records shall indicate the nature, number, and type of deficiencies found, the quantities approved and rejected, and the nature of corrective actions taken. The Contractor shall maintain standard testing equipment and qualified personnel as required by the Contract.

The QCP shall include the testing and record keeping requirements for each item as contained in the Contract. The number preceding each item refers to the item and specification number in the Standard Specifications. When testing requirements are not specified, the Contractor shall perform all testing and record keeping as recommended by the manufacturer, vendor, or supplier.

If an item is required to be in the QCP but the Contract does not specify testing

requirements, the Contractor shall propose testing requirements in the QCP.

The Contractor shall maintain Control Charts in a manner and location acceptable to the Department. At a minimum, the Control Charts shall identify the project number, the Pay Item number, each test parameter, the upper and lower control limits applicable to each test parameter, and the running average of the last three Contractor test results. The Contractor shall use the Control Charts as part of a process control system for identifying production and equipment problems and for identifying potential quality reductions before they occur. Acceptable Control Charts are part of the approved QCP.

After final records review, the Contractor will certify in writing to the Department that the project has been constructed and inspected, and all materials have been tested in accordance with the Contract.

106.4.4 QC Inspector Qualifications When a QCP is required, the Contractor's QC Inspectors shall hold all certifications from MCTCB or NETTCP that apply to the items included in the QCP. The Department may require the Contractor to remove Inspectors from the project that are not certified as required or that are otherwise unqualified or unable to fulfill their duties in a good and workmanlike manner.

106.4.5 Inspection Requirements The QCP shall cover all construction operations on the site and at off-site production facilities, keyed to the proposed construction materials, sequence and schedule. The QCP shall also identify QC personnel (including qualifications), procedures, controls, tests, records, and forms to be used.

The Contractor shall provide a copy of each completed QC report to the Department by 1:00 PM on the day following each construction activity, unless other arrangements are made with the Resident. Failure to provide this report will constitute non-compliance with the QCP and the Contract.

If an item is required to be in the QCP but QC Inspection requirements are not specified in the Contract, the Contractor shall propose inspection and record keeping requirements for such items in the QCP.

106.4.6 QCP Non-Compliance The Contractor shall comply with the approved QCP and shall take all other steps necessary to assure a high quality project.

Failure by the Contractor to comply with the approved Quality Control Plan will result in the following actions:

1st Incident: Written warning. If the Contractor does not take corrective action upon receipt of written warning, the Department will escalate immediately to the 2nd Incident.

2nd Incident: Mandatory work suspension until compliance and loss of 1% of the Bid Price of all Pay Items covered by the QCP, as described in this Section.

3rd Incident: Mandatory work suspension until compliance and loss of an additional 2% of the Bid Price of all Pay Items covered by the QCP, as described in this Section.

4th and subsequent Incidents: Mandatory work suspension until compliance and loss of an additional 3% of the Bid Price (each occurrence) of all Contract Pay Items covered by the QCP, as described in this Section.

During all periods of the Contractor's failure to follow the approved QCP, no positive pay incentives will be calculated or paid if the Department accepts the material.

Disincentives for failure to comply with the approved QCP are additive, and the Department will deduct any disincentives due from amounts otherwise due the Contractor. These disincentives are intended to encourage the Contractor to comply with its approved QCP, and are not related to the quality of the material provided.

106.5 Quality Assurance The Department will conduct Quality Assurance by:

- Review of QC Reports provided by the Contractor.
- Random inspection of work previously inspected by the Contractor.
- Randomly accompanying the Contractor's inspector during QC Inspections/Testing.
- Acceptance and IA sampling and testing of materials or completed work.

The Department's objective is a high quality project through a cooperative effort with the Contractor. Items, which are to be buried, covered, are of high cost, or affect the long-

term durability of the work will receive extra attention in the QA effort.

Unacceptable work, found by the Department's Inspector, will be brought to the attention of the Resident, who will determine what corrective action that the Contractor will take. The Contractor shall schedule the corrective work with the Resident, and both the QC and Department's Inspectors will witness the corrective work. Failure of the Contractor to correct unacceptable work in a timely manner, as determined by the Department, may result in the withholding of progress payment(s) or suspension of the work, or both. The Contractor will not be eligible for either additional monetary compensation or a time extension should this happen. If necessary for protection of the work or for public convenience, the Department may accomplish corrective work by other means and deduct the cost from any monies due the Contractor.

The Department may review and obtain copies of all QC test reports (including original test data), inspections reports, and control charts at all reasonable times without cost to the Department.

If the Department decides to inspect the materials or operations at the plant, then the following conditions shall be met:

- A. The Department shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has arranged for materials.
- B. The Department shall have full access at all times to the parts of the plant that concern the manufacture and production of the materials being furnished.
- C. If required, the Contractor shall arrange for an approved testing laboratory building for the sole use of the Department. The building shall be located near the plant and conform to the requirements of Section 639 - Engineering Facilities.
- D. The Contractor shall provide any needed equipment for safe access to plant stockpiles, equipment, and operations.

106.6 Acceptance The Department is responsible for determining the acceptability of the Work. Acceptance of the material is based on the visual inspection of the construction, monitoring of the Contractor's QCP, and Acceptance Test results. Acceptance sampling and testing is the responsibility of the Department (unless alternate

procedures are specified) except for furnishing facilities, testing equipment, transportation, and material samples as required.

Acceptance of Hot Mix Asphalt Pavement will be based on Method A Statistical Acceptance, Method B, or Method C (Small Quantity - Product Verification) as specified. The method of acceptance for each item is defined in Special Provision, Section 403, Hot Mix Asphalt Pavement. When items of Hot Mix Asphalt Pavement are not so designated, Method A will be utilized whenever there are more than 1000 megagrams [1100 ton] per Hot Mix Asphalt Pavement item, and Method B will be utilized when there are less than or equal to 1000 megagrams [1100 ton] per Hot Mix Asphalt Pavement item.

Acceptance of structural concrete will be based on Method A Statistical Acceptance, Method B Small Quantity-Product Verification, or Method C Verification. Items to be accepted under Method A, Method B, or Method C are defined in Special Provision, Section 502, Structural Concrete Acceptance Methods. When items of cast-in-place concrete are not so designated, Method B will be utilized when there are more than 10 cubic meters [13 yd³] and Method C will be used when there are 10 cubic meters [13 yd³] or less.

The Department may reject material, which appears to be defective based on visual inspection. No payment will be made for the materials rejected by the Department unless the Contractor requests the material be tested. If so requested prior to disposal, the Department will obtain and test three representative samples. The test results will be statistically evaluated in accordance with Section 106.7 - Quality Level Analysis. If the analysis yields a Pay Factor of less than 0.80, the material may be rejected and the Contractor will bear the cost of the sampling, testing, and evaluation.

Prior to knowledge of the sample location, the Contractor may remove and replace defective material at no cost to the Department. This will not preclude visual rejection of obviously defective material. The Department will sample, test, and evaluate new material for acceptance.

A. Methods A and B utilize the Quality Level Analysis and Pay Factor Specifications described in Section 106.7 - Quality Level Analysis and in Tables 106.7 A, along with specific information contained in the Divisions 400 and 500 Specifications.

Pay Items specified to be sampled and tested under Method A and B provisions will be evaluated for acceptance in accordance with the guidelines specified for that Pay Item. All Acceptance Test results for a lot as defined in the Specification will be analyzed collectively and statistically by the Quality Level Analysis - Standard Deviation (Specification Conformance Analysis) Method using the procedures listed to determine the total estimated percent of the lot that is within specification limits. Quality Level Analysis (Specification Conformance Analysis) is a statistical procedure for estimating the percent compliance with a specification and is affected by shifts in the arithmetic mean (\bar{x}) and by the sample standard deviation (s). Analysis of test results will be based on an Acceptance Quality Level (AQL) of 90.0, unless otherwise specified. AQL may be viewed as the lowest percent within the specification limits of a material that is acceptable as a process average and receive 100% pay. The Department will exclude test results on material not incorporated in the work from the Quality Level Analysis.

At the Department's sole discretion, a lot with a Pay Factor of less than 0.80 for Method A or 0.83 for Method B will be either (1) removed and replaced with acceptable material at the Contractor's expense, or (2) accepted and paid for at a Pay Factor determined by the Department. The Department may also reject material with a Pay Factor at or above these levels, but such material will be removed and replaced by the Contractor at the Department's expense.

B. Method C utilizes Product Verification testing to validate the quality of the material incorporated into the Project. The Contractor shall provide the Department with a Certification Letter that indicates that the material supplied complies with the Specifications. Test results representative of the certified material shall be attached to the letter.

The Department will randomly sample and test the certified material for properties noted in Table 1 of Section 502 - Structural Concrete or Table 9 of Section 401.20 - Acceptance. Material will be subject to rejection as noted in Structural Concrete Section 502.0504 - Quality Assurance Method C Concrete or Hot Mix Asphalt, Section 401.203 - Quality Assurance Method C.

106.7 Quality Level Analysis

106.7.1 Standard Deviation Method Standard Deviation Method procedures are as follows:

A. Determine the arithmetic mean (\bar{x}) of the test results:

$$\bar{x} = \frac{\sum x_i}{n}$$

Where \sum = summation of

x_i = individual test value

n = total number of test values

B. Compute the sample standard deviation (s):

$$s = \text{Square root of } \frac{\sum (x_i - \bar{x})^2}{n-1}$$

Where \sum = summation of

x_i = individual test values

\bar{x} = mean test value

n = total number of test values

C. Compute the upper quality index (Q_U):

$$Q_U = \frac{USL - \bar{X}}{s}$$

Where USL = upper specification limit.

D. Compute the lower quality index (Q_L):

$$Q_L = \frac{\bar{X} - LSL}{s}$$

Where LSL = lower specification limit.

E. Determine P_U (percent within the upper Specification limit which corresponds to a given Q_U) from Table 106.7 A.

Note: If a USL is not specified, P_U will be 100.

F. Determine P_L (percent within the lower Specification limit which corresponds to a given Q_L) from Table 106.7 A.

Note: If a LSL is not specified, P_L will be 100.

G. Determine the Quality Level (total percent within Specification limits).

$$\text{Quality Level} = (P_U + P_L) - 100$$

H. Determine the Pay Factor (PF) for the lot using the Quality Level from Step G.

$$\text{Method A: } PF = [55 + (\text{Quality Level} * 0.5)] * 0.01$$

$$\text{Method B: } PF = [70 + (\text{Quality Level} * 0.33)] * 0.01$$

I. Determine the Composite Pay Factor (CPF) for each lot.

$$CPF = \frac{[f_1(PF_1) + f_2(PF_2) + \dots + f_J(PF_J)]}{\sum f}$$

Where f_J = price adjustment factor listed in the specifications for the applicable property.

PF_J = Pay Factor for the applicable property.

$\sum f$ = Sum of the “f” (price adjustment) factors.

Note: Numbers used in the above calculations shall be carried to significant figures and rounded according to AASHTO Standard Recommended Practice R-11.

106.7.2 Statistical Outliers This procedure specifies how outlying observations in sample test results will be evaluated for their statistical significance. The Department will use

this procedure for only those items that are specified to be checked for outlying observations.

An outlying observation, or “outlier” is one that appears to deviate markedly from other sample test values in the lot.

When specified, the procedure will determine whether any value is a statistical outlier. If a test result is found to be an outlier, the Department’s Testing Section will investigate the outlying value to determine if it should be retained or discarded. The investigation will include but not be limited to: examination of all available test data and inspection reports relating to the questionable test result, possible additional testing, and discussions with appropriate Contractor and Department personnel. If the investigation concludes that an assignable cause cannot be determined for the outlying value, it will be discarded; otherwise, it will be retained for pay factor determination.

Procedure

- A. Calculate the sample average (\bar{x}) and standard deviation(s) of all the values in the lot.
- B. Find the value “t” from Table 106.7 B corresponding to the sample size for the lot.
- C. Determine D (the total allowable deviation from the average) by multiplying t by s.
- D. Establish values for MAX and MIN by the following:

$$\text{MAX} = \bar{x} + D \qquad \text{MIN} = \bar{x} - D$$
- E. Any value greater than MAX or less than MIN is an outlier. The Department will investigate any outlying values before determining the Pay Factor for that lot.

Table 106.7 A - Quality Level Analysis by the Standard Deviation Method

	Upper Quality Index QU or Lower Quality Index QL

PU	n = 10 to														
Or	n = 12 n = 15 n = 19 n = 26 n = 38 n = 70 n = 201														
PL %*	n = 3	n = 4	n = 5	n = 6	n = 7	n = 8	n = 9	n = 11	n = 14	n = 18	n = 25	n = 37	n = 69	n = 200	n = x
100	1.16	1.50	1.79	2.03	2.23	2.39	2.53	2.65	2.83	3.03	3.20	3.38	3.54	3.70	3.83
99		1.47	1.67	1.80	1.89	1.95	2.00	2.04	2.09	2.14	2.18	2.22	2.26	2.29	2.31
98	1.15	1.44	1.60	1.70	1.76	1.81	1.84	1.86	1.91	1.93	1.96	1.99	2.01	2.03	2.05
97		1.41	1.54	1.62	1.67	1.70	1.72	1.74	1.77	1.79	1.81	1.83	1.85	1.86	1.87
96	1.14	1.38	1.49	1.55	1.59	1.61	1.63	1.65	1.67	1.68	1.70	1.71	1.73	1.74	1.75
95		1.35	1.44	1.49	1.52	1.54	1.55	1.56	1.58	1.59	1.61	1.62	1.63	1.63	1.64
94	1.13	1.32	1.39	1.43	1.46	1.47	1.48	1.49	1.50	1.51	1.52	1.53	1.54	1.55	1.55
93		1.29	1.35	1.38	1.40	1.41	1.42	1.43	1.44	1.44	1.45	1.46	1.46	1.47	1.47
92	1.12	1.26	1.31	1.33	1.35	1.36	1.36	1.37	1.37	1.38	1.39	1.39	1.40	1.40	1.40
91	1.11	1.23	1.27	1.29	1.30	1.30	1.31	1.31	1.32	1.32	1.33	1.33	1.33	1.34	1.34
90	1.10	1.20	1.23	1.24	1.25	1.25	1.26	1.26	1.26	1.27	1.27	1.27	1.28	1.28	1.28
89	1.09	1.17	1.19	1.20	1.20	1.21	1.21	1.21	1.21	1.22	1.22	1.22	1.22	1.22	1.23
88	1.07	1.14	1.15	1.16	1.16	1.16	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17
87	1.06	1.11	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.13	1.13
86	1.04	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
85	1.03	1.05	1.05	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
84	1.01	1.02	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
83	1.00	0.99	0.98	0.97	0.97	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.95	0.95	0.95
82	0.97	0.96	0.95	0.94	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
81	0.96	0.93	0.91	0.90	0.90	0.89	0.89	0.89	0.89	0.88	0.88	0.88	0.88	0.88	0.88
80	0.93	0.90	0.88	0.87	0.86	0.86	0.86	0.85	0.85	0.85	0.85	0.84	0.84	0.84	0.84
79	0.91	0.87	0.85	0.84	0.83	0.82	0.82	0.82	0.82	0.81	0.81	0.81	0.81	0.81	0.81
78	0.89	0.84	0.82	0.80	0.80	0.79	0.79	0.79	0.78	0.78	0.78	0.78	0.77	0.77	0.77
77	0.87	0.81	0.78	0.77	0.76	0.76	0.76	0.75	0.75	0.75	0.75	0.74	0.74	0.74	0.74
76	0.84	0.78	0.75	0.74	0.73	0.73	0.72	0.72	0.72	0.71	0.71	0.71	0.71	0.71	0.71
75	0.82	0.75	0.72	0.71	0.70	0.70	0.69	0.69	0.69	0.68	0.68	0.68	0.68	0.68	0.67
74	0.79	0.72	0.69	0.68	0.67	0.66	0.66	0.66	0.66	0.65	0.65	0.65	0.65	0.64	0.64
73	0.76	0.69	0.66	0.65	0.64	0.63	0.63	0.63	0.62	0.62	0.62	0.62	0.62	0.61	0.61
72	0.74	0.66	0.63	0.62	0.61	0.60	0.60	0.60	0.59	0.59	0.59	0.59	0.59	0.58	0.58
71	0.71	0.63	0.60	0.59	0.58	0.57	0.57	0.57	0.57	0.56	0.56	0.56	0.56	0.55	0.55
70	0.68	0.60	0.57	0.56	0.55	0.55	0.54	0.54	0.54	0.53	0.53	0.53	0.53	0.53	0.52
69	0.65	0.57	0.54	0.53	0.52	0.52	0.51	0.51	0.51	0.50	0.50	0.50	0.50	0.50	0.50
68	0.62	0.54	0.51	0.50	0.49	0.49	0.48	0.48	0.48	0.48	0.47	0.47	0.47	0.47	0.47
67	0.59	0.51	0.47	0.47	0.46	0.46	0.46	0.45	0.45	0.45	0.45	0.44	0.44	0.44	0.44
66	0.56	0.48	0.45	0.44	0.44	0.43	0.43	0.43	0.42	0.42	0.42	0.42	0.41	0.41	0.41
65	0.52	0.45	0.43	0.41	0.41	0.40	0.40	0.40	0.40	0.39	0.39	0.39	0.39	0.39	0.39
64	0.49	0.42	0.40	0.39	0.38	0.38	0.37	0.37	0.37	0.37	0.36	0.36	0.36	0.36	0.36
63	0.46	0.39	0.37	0.36	0.35	0.35	0.35	0.34	0.34	0.34	0.34	0.34	0.33	0.33	0.33
62	0.43	0.36	0.34	0.33	0.32	0.32	0.32	0.32	0.31	0.31	0.31	0.31	0.31	0.31	0.31
61	0.39	0.33	0.31	0.30	0.30	0.29	0.29	0.29	0.29	0.29	0.28	0.28	0.28	0.28	0.28

60	0.36	0.30	0.28	0.27	0.27	0.27	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.25	0.25
59	0.32	0.27	0.25	0.25	0.24	0.24	0.24	0.24	0.23	0.23	0.23	0.23	0.23	0.23	0.23
58	0.29	0.24	0.23	0.22	0.21	0.21	0.21	0.21	0.21	0.21	0.20	0.20	0.20	0.20	0.20
57	0.25	0.21	0.20	0.19	0.19	0.19	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
56	0.22	0.18	0.17	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.15
55	0.18	0.15	0.14	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
54	0.14	0.12	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
53	0.11	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
52	0.07	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
51	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: For negative values of QU or QL, PU or PL is equal to 100 minus the table value for PU or PL. If the value of QU or QL does not correspond exactly to a figure in the table, use the next higher figure.

* Within limits for positive values

Table 106.7 B - Values of t

n	t
3	1.155
4	1.481
5	1.715
6	1.887
7	2.020
8	2.126
9	2.215
10	2.290
11	2.355
12	2.412
13	2.462
14	2.507
15	2.549
16	2.585
17	2.620
18	2.651
19	2.681
20	2.709
21	2.733

22	2.758
23	2.781
24	2.802
25	2.822
26	2.841
27	2.859
28	2.876
29	2.893
30	2.908

106.8 Non-Conforming Work

106.8.1 Substantially Conforming Work If the Department determines that non-conforming work substantially conforms to the Contract, the Department may accept the non-conforming work, provided that the Department may require a credit to the Department to be deducted from amounts otherwise due the Contractor. If the Department and Contractor cannot agree to the amount of the credit, the work shall be unacceptable work.

106.8.2 Unacceptable Work The Contractor shall remove, replace, or otherwise correct all unacceptable work as directed by the Department at the expense of the Contractor, without cost or liability to the Department.

106.8.3 Unauthorized Work Prior to Final Acceptance and upon written order by the Department, the Contractor shall remove or uncover unauthorized work. After examination, the Contractor shall rebuild the uncovered work to a condition conforming to the Contract at the expense of the Contractor and without cost or liability to the Department. Any delay arising from unauthorized work shall be an inexcusable delay.

106.8.4 Uninspected Work Prior to Final Acceptance and upon written order by the Department, the Contractor shall uncover uninspected work. After examination, the Contractor shall rebuild the uncovered work to a condition conforming to the Contract. If the Department determines that the uninspected work is acceptable, the uncovering, removing, and rebuilding will be paid as extra work, and any resulting delay shall be an excusable delay. If the Department reasonably determines that the uninspected work is unacceptable, the uncovering, removing, and rebuilding shall be at the Contractor's

expense and any resulting delay shall be an inexcusable delay.

106.9 Warranty Provisions

106.9.1 Warranty By Contractor The Contractor unconditionally warrants and guarantees that the project will be free from warranty defects for one year from the date of Final Acceptance. Final Acceptance includes receipt of all conforming closeout documentation. For a related provision, see Section 107.9.5 - Final Acceptance.

If the Department discovers any warranty defects during the warranty period, the Contractor agrees to promptly perform all remedial work at no additional cost or liability to the Department.

For a related provision regarding obligations regarding plantings, see Section 104.5.9 - Landscape Subcontractors.

106.9.2 Warranty Definitions Notwithstanding any other provision of the Contract, the following words or phrases have the following definitions for the purposes of the Contractor's warranty obligation under this Contract.

Warranty Defects Conditions that result from material, manufacture, or workmanship and that are not in conformity with the Contract or with industry standards applicable to the work prevailing at the time of submission of the bid. Warranty defects do not include (A) normal wear and tear, (B) conditions caused by occurrences clearly beyond the Contractor's control and not attributable to material, manufacture, or workmanship, and (C) Defects in landscape items that are the subject of Landscape Establishment Period Obligations. Examples of such excepted occurrences might be fires, floods, abnormally poor weather for the site of work, accidents, improper use, improper maintenance, vandalism, or acts of God.

Emergency Emergency means necessary for public safety or convenience, as determined by the Department.

Promptly Unless an emergency, "Promptly" means in the first construction season after the Contractor has been notified of the defect(s), but always within one year of such notice. In case of emergency, Promptly means within 48 hours.

Remedial Work “Remedial Work” means all work necessary to make the item in like new condition as reasonably determined by the Department and performed in accordance with the Contract and in a good and skillful manner. Remedial Work includes all design, permitting, project management, supervision, materials, and labor, including erosion control and traffic control.

106.9.3 Remedial Work Procedure and Requirements Within (30) Days of being notified of warranty defects, the Contractor shall submit to the Department for approval a Remedial Work Plan including the scope of work, conceptual work methods, schedule, construction phasing, and other significant aspects of the work (the “Work Plan”). Unless otherwise provided by the Department in writing, any work commenced prior to Department’s approval of the Work Plan will be at the Contractor’s sole risk. Before starting any on-site work, the Contractor shall deliver to the Department certificates of insurance complying with Section 110.3 - Insurance. If the estimated cost of remedial work exceeds \$100,000, the Contractor shall provide performance and Payment Bonds complying with Section 110.2 - Performance and Payment Bonds.

If (A) the Contractor fails to submit a Remedial Work Plan, (B) the Contractor does not comply otherwise with written instructions from the Department, or (C) a State of emergency exists in which delay would cause serious risk of loss or damage, then the Department may perform or Contract for such remedial work and the Contractor will be responsible for all claims, costs, damages, losses, and expenses arising out of such work including fees and charges of engineers, consultants, attorneys, dispute resolution professionals, and court costs.

Upon a final inspection satisfactory to the Department, the Department will issue a written acceptance of the remedial work. The Contractor warrants and guarantees all remedial work to be free from warranty defects for one year after such acceptance.

106.9.4 Other Warranty Provisions The Contractor hereby assigns to the Department the right to enforce all manufacturer’s warranties or guarantees on all materials, equipment or products purchased for the work that exceed the nature or duration of the warranty obligations assumed by the Contractor under this Contract.

The Performance Bond and/or Warranty Bond required by Section 110.2.1 - Bonds shall cover all warranty obligations of the Contractor provided by this Contract. Final Acceptance by the Department does not relieve the Contractor of any warranty

obligations provided by this Contract.

The Contractor agrees that the warranty obligations provided by this Contract shall be reported as an outstanding obligation in the event of bankruptcy, dissolution, or the sale, merger, or cessation of operations of the Contractor.

SECTION 107 - TIME

Scope of Section This Section contains general time-related provisions of the Contract including the Contract Time, allowable Work times, schedule requirements, Liquidated Damages, and Project Closeout.

107.1 Contract Time and Contract Completion Date All Work must be Complete by the Contract Completion Date and within the Contract Time. Unless expressly provided otherwise by the Department in writing, the Contract Time shall be all time between the Contract Execution and the Completion date specified in the Contract, and any authorized extensions.

107.2 Commencement of Contract Time and Work Unless provided elsewhere in this Contract or in writing from the Department, the Contract Time will commence on the date of Contract Execution. For related provisions, see Sections 101.2 - Definitions of Contract Execution and 103.8 - Execution of Contract by the Department.

Unless specified otherwise, Work may commence upon Contract Execution, unless the Contractor has not secured and provided the Performance and Payment Bonds and Insurance Certificates required by Sections 103.5 - Award Conditions, 110.2 - Bonding, and 110.3 - Insurance. Any Work performed before the requirements of these sections are met is Unauthorized Work and is at the sole risk of the Contractor. Pursuant to Section 110.1 - Indemnification, the Contractor and Surety shall indemnify and hold harmless the Department from any claims arising from Work.

107.3 Allowable Work Times

107.3.1 General Work can be performed at any time except Sundays and Holidays, unless expressly specified otherwise in this Contract, including any applicable Permit conditions.